USAID Program and Operations Assessment Report No. 8
Captial Projects: A Synthesis of Findings
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Foreword

Interest has been growing for some time among U.S. exporters, in some parts of Congress, and in the Executive Branch in using foreign assistance to advance U.S. commercial interests. Advocates argue that U.S. commercial interests can be served without jeopardizing the international development objectives of the foreign aid program. Congressional proposals have called for establishing a capital projects fund, a mixed credit program, and other trade-related programs.

Proponents have suggested many reasons for using capital projects to promote both economic development and U.S. commercial interests; but these ideas are based largely on anecdotes or untested hypotheses. Therefore, the U.S. Agency for International Development (USAID) Center for Development Information and Evaluation (CDIE) decided to carefully analyze seven key hypotheses to determine how and under what conditions capital project assistance can support both objectives. This paper presents the findings from CDIE's assessment and makes recommendations to USAID management on how to maximize the developmental and commercial benefits of capital projects. The assessment draws on two data sources: The first is an examination of USAID capital project experience along with data from U.S. exporters, the World Bank, and other donors. The second is an in-depth country case study of capital projects in Egypt. Egypt represents the largest capital projects program in the USAID portfolio.

Summary

Exporters from the United States often complain that they are losing sales in developing countries to businesses from other nations that use foreign aid aggressively to promote their own exports. They contend that while the U.S. aid program places heavy emphasis on technical assistance, training, institutional development, policy reform, and sustainability, other donors are busy pushing their own capital exports.

Some have suggested that the U.S. Agency for International Development (USAID) should make greater use of capital projects in its assistance program. Capital projects, they claim, can meet

a variety of developmental needs and also help U.S. exporters who supply the project equipment, materials, and engineering services.

Because many capital projects include a large component of imported U.S. equipment, U.S. firms benefit in the first round from USAID-financed sales. If firms then gain a foothold in the developing country market through the USAID projects, they will benefit in later rounds with follow-on commercial sales. In short, USAID capital projects develop export markets in developing countries by introducing U.S. brands and U.S. technical standards, thus generating future business for U.S. firms.

The USAID Center for Development Information and Evaluation (CDIE) undertook an assessment of whether capital projects are effective in promoting both economic development and U.S. commercial interests. CDIE conducted the following activities to analyze the issues from several perspectives:

A review of academic studies and research on capital projects

An analysis of documents on USAID's experience with 68 completed capital projects in 25 countries

Interviews with 44 U.S. exporters

A review of World Bank capital project experience

A detailed case study in Egypt, which included economic rate-of-return (ERR) analysis, an examination of historical trade and aid relationships, and an analysis of the developmental and commercial effects of nine USAID capital projects

CDIE found that capital projects are clearly important for development. In many developing countries inadequate infrastructure constrains economic growth and holds back the private sector. A few critical investments, such as an all-weather road or reliable electrical supply, are often all that is needed for a major increase in agricultural or industrial production. In addition, capital projects can provide important benefits (e.g., improved health from water and sewage systems) for low-income members of society. However, on the commercial side U.S. benefits have been very limited.

The key findings of the assessment are that:

Capital projects have rarely been able to leverage other donor or private-investor participation in USAID projects.

U.S. exporters consider their USAID contracts to be an important part of their businesses. However, little evidence exists that USAID capital projects generate any major increases in commercial follow-on sales.

Capital projects infrastructure ones in particular are critical

elements of economic growth and are viewed universally as prerequisites to development.

Capital projects usually have fair to good ERRs. However, all too many projects have low rates of return because of developing country institutional and policy problems.

Capital projects provide important benefits to a developing country's private sector. Capital projects in sectors that provide benefits to the poor have important impacts on basic human needs.

Both World Bank and USAID projects face difficulties when developing country governments are reluctant to adopt needed institutional and economic policy reforms. In such cases, project sustainability is threatened.

USAID has made sure that projects first and foremost meet the developmental needs of recipient countries. Therefore, a conflict between development and U.S. commercial interests has not been created.

Capital projects are important for development; but in most instances they have not helped to increase U.S. exports beyond what the projects need. USAID capital projects might help increase commercial U.S. exports but only if those exports are competitive in price, quality, and service.

U.S. exports have grown most rapidly when the economies of developing countries are growing rapidly. For U.S. exporters, a Taiwan or Korea is a much better market than an Egypt or Pakistan. Aid programs cannot build markets in countries that have poor economic policies that restrict growth and the demand for imports.

Glossary

CDIE Center for Development Information and Evaluation, USAID
CIP Commodity Import Program
ERR economic rate of return
ESF Economic Support Fund
OECD Organization for Economic Cooperation and Development
O&M operations and maintenance
USAID U.S. Agency for International Development

1. Introduction

A capital project is defined for this assessment as
A project and supporting activities that encourage economic development by creating, replacing, or rehabilitating physical infrastructure or industrial plant and equipment in a developing country.

The definition stresses physical assets and development. It includes the bricks and mortar of construction along with capital

equipment and machinery. It does not include capital finance projects that provide only credit or loans. And it excludes raw materials and intermediate goods as well.

The development requirement means that the project must relate to the improvement of a country's economic and social welfare. Most industrial and infrastructure investments are developmental in this sense and supporting activities include training, technical assistance, and equipment to support the management, operations, and maintenance of the capital project.

Because the assessment focuses on both commercial and developmental impacts of capital projects, it makes a special effort to include projects with both developmental and potential U.S. commercial impacts. Questions concerning the commercial side of capital projects are a major part of this evaluation.
Why look at capital projects? U.S. exporters have urged USAID to fund more capital projects. There is also interest in some parts of Congress and in the Executive Branch in using U.S. foreign assistance to advance U.S. commercial interests, while also maintaining the international development objectives of the foreign aid program. There have been Congressional and other proposals to establish a capital projects fund, a mixed credit program, and other trade-related programs.

Capital projects are a relatively small share of USAID's current program, representing only 5 to 10 percent of the total portfolio. Many such projects generate few exports for U.S. firms, because they often use simple technology and local materials (as in projects for rural roads, rural health centers, irrigation, and village water supplies). Other donors, however, devote most of their foreign aid programs to capital projects that call for importing large portions of capital equipment from the donor country (e.g., projects for factories, subway systems, railroads, electrical power stations, computers, and telecommunication systems). Some argue that firms in other donor countries are reaping export orders from developing countries while U.S. firms are not. Other donors are also practicing market development, as their aid programs lay the groundwork for future commercial exports.

Capital projects clearly play an important role in economic development. The pace of development depends in large part on the amount of capital investment a developing country has and how efficiently it is used. Capital investments, particularly in infrastructure, are a prerequisite for broad-based growth. Without adequate roads, ports, and electrical power, agricultural and industrial production are hampered, commerce and trade are inefficient, and development suffers. It is argued that if a donor, such as USAID, wants to help speed up development, it should fund capital projects. Such investments encourage private sector investment and increase productivity and trade. Thus, the argument goes, capital investments help U.S. exporters and support growth in developing countries.

Much has been written about promoting U.S. exports. This

assessment does not attempt to cover that territory again. Rather, the assessment critically examines the arguments that capital projects make good development sense and help U.S. commercial interests by developing export markets.

2. USAID's Approach to Capital Projects

In the 1950s, and 1960s U.S. economic assistance funded a wide variety of capital projects throughout the developing world. This continued into the 1970s, but, with the advent of the basic human needs approach, funding for capital projects declined. Funding declined further in the 1980s when resource transfers were deemphasized in favor of focusing assistance in ways that would affect overall economic efficiency. In the last 10 years, USAID funding of capital projects has been very limited, except in several large Economic Support Fund (ESF) countries such as Egypt, Pakistan, Jordan, and the Philippines, where U.S. political and security interests are very important.
There are those who question the developmental benefits of capital projects. They point to the 1950s and 1960s when developing countries made large capital investments that seemed to generate few economic benefits. Large infrastructure investments were expected to generate benefits that would eventually trickle down to the poor but, all too often, they did not seem to improve the lot of the poor. Some large capital investments became white elephants, imposing maintenance and financial burdens well beyond the capacity of most developing countries. There was also an urban bias, with capital investments usually concentrated in cities, which were generally more prosperous and already receiving more government services than rural areas.

Nevertheless, proponents of capital assistance have suggested a number of arguments and hypotheses to support such aid. They argue that capital projects advance development, promote U.S. exports, and are often more appropriate than other types of assistance. Proponents note that capital projects (particularly infrastructure) can generate high economic rates of return (ERRs), support private sector development, encourage policy reform, and help the poor meet basic human needs.

Scope of the Assessment

This study examines the evidence on both sides of the argument that capital projects make good commercial sense for the United States and good developmental sense for developing countries. The analysis is structured around two sets of issues one concerns U.S. commercial benefits of capital projects and the other addresses developmental benefits. The assessment discusses each side separately but also considers the relationship and tradeoffs between them. The analysis of commercial and developmental benefits is structured around seven issues or hypotheses, which are posed as questions to be answered by this assessment (see box).

At one time or another, USAID has implemented capital projects in

nearly all of its recipient country programs. However, many of the projects (such as rural roads, building construction, and rural water supplies) included very little imported equipment and, thus, did not directly generate significant exports or follow-on business for U.S. firms. Experience from these types of projects could help answer the developmental questions, but such projects do not provide data for the commercial ones. Only a few USAID recipients in the last 10 years, (Egypt, Pakistan, the Philippines, Indonesia, and Jordan) have had USAID capital projects of a type and scale that could shed light on both developmental and commercial questions.

In many respects those countries had very similar programs. Their capital projects are large, with a substantial component of imported equipment. The projects usually included U.S. engineering services and often used relatively high-tech industrial equipment and machinery. The projects made important contributions to development by providing key equipment, machinery, and infrastructure. All of these countries were very important for U.S. political or security interests; in fact, the aid programs were driven in large part by nondevelopmental concerns (country program levels would have been substantially lower had they been based only on developmental considerations). This point is underlined by USAID's budget system, which has had an Economic Support Fund for countries where political concerns are paramount and Development Assistance funding for countries where development is the primary concern. Countries with large capital projects programs have usually been ESF recipients.

Assessment Methodology

CDIE started the analysis with a review of academic research on the developmental and commercial benefits of capital projects. The next step was a review of World Bank experience with capital projects, including individual project, sector, and program evaluations. CDIE then identified a data base of 400 completed USAID capital projects, from which a representative sample of 68 projects was selected that would:

Address the key evaluation questions

Cover all USAID regions

Include large and small projects

Reflect the capital project sectors in USAID's portfolio (electricity, ports, irrigation, roads, drinking water)

CDIE analyzed Project Papers, audits, and evaluations for each of the 68 projects against the seven evaluation questions in the box. To answer the questions from the perspective of U.S. exporters, CDIE studied a representative sample of 44 firms. These 44 firms had participated in the projects included in the data base of 400 selected for this assessment. The sample of firms included:

Large and small firms

Firms that provided materials and equipment

Design, engineering, and management firms

The firms were representative of all USAID-funded capital sectors electricity, ports, irrigation, roads, and drinking water. CDIE sent them questionnaires and then followed up with in-depth interviews.

After completing the U.S.-based literature review, interviews with U.S. exporters, and a review of documents on USAID's worldwide capital projects program, the next step was CDIE's field analysis concerning commercial aspects of USAID capital projects and how such projects contributed to export development for U.S. firms.

The ideal field analysis would examine a sample of 30-40 projects in 5 or 6 countries. But because of CDIE resource limitations, this was not possible. It was possible, however, to answer the evaluation questions by analyzing in-depth USAID experience in only one country Egypt. In dollar terms, Egypt is USAID's second largest program (Israel is the largest) and the Egypt Mission has implemented more than 50 capital projects over the last 15 years. Middle-East peace concerns are an important reason for the program's large size.

Although no two countries are alike, it is still possible to draw generalizable conclusions from a fairly typical program. In many respects the Egypt program is similar to other USAID country programs focused on capital projects. Therefore, CDIE decided to thoroughly analyze capital projects in Egypt rather than superficially examine those in several countries. The findings from the Egypt case study provide data drawn from a setting similar to that in other countries where capital projects have developmental and commercial impacts and where the USAID program is driven in part by U.S. political and security interests.

3. Assessment Findings

Posing the assessment questions from several different perspectives enabled CDIE to conduct a comprehensive and impartial analysis. The analysis includes data from five sources:

Academic researchers

World Bank experience

U.S. exporters' experience

USAID project documents from a worldwide sample

Egypt country case study

By using the same set of questions both to examine academic

literature and USAID's worldwide experience, and to query U.S. exporters, USAID project managers, and developing country business and government officials, it was possible to develop, cross-check, and confirm the findings. These findings are summarized in the following seven sections.

Commercial Benefits Of Capital Projects

1. To what extent have USAID capital projects leveraged other donor and private investor participation?

Some argue that capital projects are a good way to leverage private sector and other donor participation, which can happen in two ways: by bringing other donors into a USAID project where they spend a portion of their funds on purchases from U.S. firms; or through the demonstration effect that is, U.S. firms build a reputation of good performance on USAID projects, which helps them win export orders for other donors' projects.

Joint or comingled funding where USAID and another donor jointly fund the same project is very rare. The review of 68 USAID capital projects could not find any cases of joint funding. However, other donors do fund separate components of a project (parallel funding), but they almost always tie procurement to their own country. Joint or parallel donor funding does not seem to generate significant export possibilities for U.S. firms. Another source of business consists of U.S. firms building their reputation by successfully implementing USAID projects and then gaining business from other donors. Based on the survey of 44 U.S. firms, 9 felt that USAID contracts had led to business with other donors. However, only four of these firms could cite a particular USAID project or contract that had led to such business. It appears that USAID projects are generating some but not much other-donor business for U.S. firms.

The Egypt case study found that other industrial donors tend to fund only their own aid projects and to tie procurement to their own country. In most cases joint or parallel donor funding is limited to efforts coordinated by the World Bank.

There were two cases in Egypt in the electrical power sector where USAID had helped to encourage other donor participation. USAID funding of the Shoubrah thermal plant helped bring in funding from other donors and the USAID-funded study of the El-Kureimat power plant is expected to help the World Bank put together a multidonor effort. Procurement in the United States by other donors in Egypt has been very limited. Also in Egypt, there were no cases of private investor participation in USAID-funded capital projects.

Conclusion. The evidence indicates that USAID capital projects have not been very important in leveraging other donor or private investor participation. There were no cases found of private investor funding and only a few cases in which another donor had provided parallel funding for a capital project. The World Bank or the regional multilateral development banks usually put

together donor funding groups. In such cases each bilateral donor takes a portion of the program, provides its own bilateral funding, and uses its own procurement rules, which usually means that goods must come from the donor country.

2. Have USAID capital projects generated commercial, follow-on U.S. exports after project completion?

A major and immediate U.S. commercial benefit from capital projects is USAID-financed equipment and construction contracts. The "Buy America" focus of most capital projects means that procurement is tied to the United States. (U.S. aid money must be spent in the United States on U.S. goods and services.) For example, when USAID finances the $10 million foreign exchange costs of a capital project, U.S. equipment suppliers and engineering firms receive contracts for $10 million. The U.S. commercial benefits are automatic the United States provides aid which is then spent in the United States. These are the first-round effects.

While first-round effects of tied aid are important to U.S. firms, of even more interest are the secondary effects what happens after the USAID procurement ends. It is frequently argued that capital projects generate follow-on, commercial sales after USAID funding ends. Those secondary effects are what many view as a major trade or commercial benefit of capital projects. Once a firm has entered and is established in a market, it should have an advantage over other firms it should be able to develop its market position with follow-on sales. When USAID finances projects and commodities, a potential market is created for follow-on spares and replacements. In addition, because U.S. assistance establishes U.S. products in a developing country market (introducing U.S. manufacturers and their brands, U.S. engineering firms, and U.S. standards and procedures), one would expect U.S. goods and services to be used increasingly in new, non-USAID projects.

A review of the literature found little support for the argument that aid is a good way to support a donor country's commercial interests. For example, a recent British study of the commercial benefits of its capital projects found that commercial and industrial benefits claimed by British firms tended to be overly optimistic. The study found few commercial or industrial benefits for the British economy as a whole and hardly any commercial, follow-on orders that were unsupported by further aid. According to results from the sample of 44 U.S. firms that had received USAID contracts during the 1980s, {Footnote 1} almost all firms considered overseas markets extremely important for their business. Exports accounted for an average of 41 percent of surveyed firms' businesses. The firms had contracts with USAID for between 10 and 15 years on average, although the average number of contracts over this time period was relatively small fewer than five. Most of the firms did not rely on USAID for a significant portion of their export business.

Of the 44 firms surveyed, 20 had done business in the beneficiary

country prior to the USAID contract. After the USAID contract 16 of the 20 continued to be active, with 12 of those 16 reporting that their business volume was relatively unchanged; two reported an increase and two reported a decrease. Thus, for firms that were already active in the beneficiary country, USAID projects did not significantly improve their market position (see Figure 1).

For 19 of the 44 firms, the USAID contract provided a new entrance into a developing country market. However, for 13 of those 19 firms, the USAID contract was the only business they ever did in the country. Only four of the firms for which USAID had provided market entry obtained follow-on business after the initial USAID contract. Thus, for firms that were coming into a new market, 21 percent received follow-on business after the USAID project. This is an encouraging sign, but it does not represent a resounding success for market development.

The survey probed deeper to assess the competitiveness of the U.S. firms. When asked, for example, if the host government would have contracted with their firms had the funding not been provided by USAID, only 7 of the 44 firms replied yes. When asked whether the cost of the commodities or services they provided was competitive with non-U.S. firms, only 10 responded affirmatively. When asked to provide reasons for being noncompetitive, most cited the higher prices of U.S. products and lack of financing. It is also notable that only 14 of the 44 firms had overseas representation. Receiving new export orders is difficult if a firm does not have an agent or representative overseas. The lack of overseas agents may indicate that U.S. firms were not so serious about increasing their exports.

The survey found that USAID contracts were important at particular moments for many of the firms surveyed, but they were not particularly important for the vast majority of the firms in terms of their non-USAID business. Few of the firms were able to convert their USAID contracts into non-USAID business. Many of the firms considered themselves to be competitively weak compared with Japanese or European exporters, a condition that the USAID projects did little or nothing to improve.

The Egypt case study confirmed most of these findings. Commercial (non-USAID-funded) sales are small compared with the volume of U.S. business carried out under the USAID program. More than one-half of the U.S. firms that supply equipment and services on USAID-funded capital projects stated they would not have any, or only extremely limited, business in Egypt if the USAID capital projects program were to end.

In all of the sectors covered in the Egypt field study (electrical power, telecommunications, water and sewers), two factors limited follow-on commercial sales:

Cost. In most cases U.S. equipment and products, although of excellent quality and reliability, are comparatively more expensive than similar goods from European and Japanese

competitors. This applies to services from U.S.-based engineering consulting firms and construction companies as well.

Marketing practices. U.S. firms operating in Egypt generally lack aggressive marketing strategies. U.S. firms seem less interested or motivated than their competitors in developing their Egyptian markets.

The survey of U.S. firms doing business in Egypt provides a firm-level analysis, which indicates that capital projects have not greatly expanded U.S. commercial exports. To check that finding, a similar examination was done at the macroeconomic level, looking at trade and aid data.{Footnote 2}

In the mid-1970s the United States launched a very large economic and military aid program in Egypt. Because almost all procurement under U.S. assistance is tied to the United States, it should at a minimum generate an equivalent volume of U.S. exports that is, Egypt uses U.S. aid funds to buy an equivalent amount of U.S. goods and sevices.

In the first instance, when the aid is provided it appears as Egyptian imports (equipment, materials, and construction services) from the United States. As capital projects age, they require spares and replacements, which most likely will also be imported from the United States. {Footnote 3} There might also be follow-on projects requiring U.S. imports and follow-on use of U.S. engineering firms. As U.S. equipment and brands gain acceptance in different fields, demand for those products should grow. Over several years such additional imports could be quite large. However, the trade data do not show the effect of any additional U.S. exports.

Overall, from 1976 to 1991, U.S. exports to Egypt were slightly lower than U.S. assistance levels (in constant dollars, $28 billion of U.S. exports and $30 billion of U.S. assistance) (see Figure 2). There was no evidence of exports having expanded to levels higher than aid levels, as one might expect if aid were having a catalytic effect. This strongly suggests that even though U.S. assistance has been tied in large measure to U.S. procurement, there has been no catalytic effect on U.S. exports. The focus of most U.S. economic assistance on capital goods and equipment, and of military assistance on hardware, should lead to more exports of U.S. manufactured goods. The U.S. share of Organization for Economic Cooperation and Development (OECD) exports of manufactured goods to Egypt was 25 percent in 1973 and 1974 (before resumption of the U.S. assistance program).

Resumption of large-scale aid in 1976 appears to have had little effect on the U.S. share of OECD exports to Egypt; the U.S. share declined moderately to 24 percent in 1976 and to 20 percent in 1987. The U.S. share averaged 28 percent during the 1988 to 1991 period. Thus, for the 1975 to 1991 period the U.S. share has been relatively stable, increasing only slightly compared with shares of the other industrialized countries (see Figure 3).

Growth in Egyptian imports from the United States depends on two factors: The rate of growth in Egypt's total imports and the U.S. share of them. If the Egyptian market is stagnant and imports are not growing, any increase in imports from the United States must come through the United States, replacing those of another trading partner. A growing Egyptian import market, on the other hand, may mean more imports from the United States and from other countries. If Egypt is to increase its imports, and if foreign aid is growing only slowly, Egypt must increase its own foreign exchange earnings by increasing its exports. Without growth in export earnings Egypt cannot increase imports.

Over the last 15 years, Egyptian export earnings have grown very slowly. Egyptian imports have increased at an even slower pace. In fact, from 1980 to 1990 there was almost no real growth in imports. Overall, during the period 1976 to 1991, the United States has been able only marginally to increase its market share in Egypt compared with the other industrial countries (Figure 3). Slow growth in the Egyptian market for imports (because of restrictive economic policies) has made Egypt a poor market for all industrial country exporters.

The evidence suggests that U.S. capital projects and commodity import programs (CIPs) have not had a significant follow-on impact on the aggregate level of U.S. exports to Egypt. Egypt clearly has been a poor market for U.S. products, and U.S. assistance has not altered this fact. A key problem has been the poor economic policy environment and the failure of the Egyptian economy to earn the foreign exchange necessary for an increase in imports. These are the main reasons why U.S. firms have not done well in the Egyptian market. In such an environment capital projects were unable to generate an increase in U.S. exports. Conclusion. USAID capital projects have not been very successful in generating commercial, follow-on U.S. exports. With U.S. exporters having difficulties competing with other exporters, and with weak markets in many developing countries, USAID capital projects have not been a very useful tool for promoting U.S. commercial exports.

Developmental Benefits Of Capital Projects

3. Under what circumstances have capital projects generated high ERRs?

One measure of a capital project's contribution to the growth of a country's economy is its ERR. An ERR reflects a number of factors: the technical or mechanical efficiency of the machinery and equipment, the managerial efficiency of operating and maintaining the equipment, and the economics of the project (the costs and benefits of the project to the economy). A minimally acceptable ERR is usually around 10 to 15 percent and highly successful projects have ERRs above 20 percent.

In many developing countries inadequate infrastructure holds back economic development. For example, the railways lack capacity so crops do not move to market. The electrical system is unreliable

so industry must shut down often, making it difficult for firms to plan their production. A lack of irrigation water at critical times means that farmers are unable to achieve full production potential. The cement plant's lack of production causes the construction industry to slow down. Given these problems, it is reasonable to assume that efficiently designed and properly timed and targeted capital investments will generate large economic benefits.

However, more capital investments are not always the solution. The World Bank's 1991 World Development Report suggests that projects operating in adverse policy settings are not likely to contribute significantly to development. The Bank argues that "inadequate infrastructure" has more to do with inefficient use of existing assets than with the need for new assets. The solution in such cases is better management and economic policy reform rather than more capital projects.

The World Bank has found that restrictive macroeconomic policies in developing countries have a major impact on projects, and, thus, the macroeconomic policy environment is a key determining factor influencing the rate of return on projects. The Bank has found ERRs are highest in undistorted markets and lowest in distorted markets. Projects implemented in an undistorted policy climate had, on average, ERRs that were 5 percentage points higher than ERRs of projects implemented in a distorted climate. Thus, while not ignoring necessary project level reforms, the Bank often stresses sector and macrolevel policy reforms in its country assistance programs.

Nothing in the literature disputes the rather obvious relationship between infrastructure development and economic growth. In the review of USAID Project Papers, ERR estimates were included in a number of design documents. The average (mean) ERR in project design documents was estimated at 15.4 percent. This is a high value, but it is important to note that the standard deviation is also very high, meaning there was a large variation among projects. Because 15.4 percent is an estimate from the time when projects were originally designed, actual project results may be quite different. However, there is almost no information on rates of return after projects were completed. In 22 percent of the projects, the evaluation documents do indicate that the assumptions used to generate ERRs in the Project Papers were no longer valid. Thus, the ERR average cited above should be interpreted carefully.

The World Bank regularly analyzes completed capital projects and computes ERRs. A good data source is the Bank's 1989 Annual Review of Evaluation Results, which reports on a study that reestimated ERRs on 1,065 completed capital projects. For the sectors examined, most World Bank projects have acceptable-to-good ERRs, although for some projects (and in particular the irrigation and potable water sectors) returns are low:

Roads 25 percent

Agriculture 16 percent

Power 11 percent

Irrigation 9 percent

Potable Water 8 percent

In the power sector, the Bank's 1991 Policy Statement noted that indicators of financial performance for power projects have shown a steady deterioration in terms of economic performance over the last 20 years. This was related to the increased price of fossil fuels. In both the power and transportation sectors, World Bank studies contained numerous examples of how capital projects helped relieve sector bottlenecks. Benefits from rural road projects were very high, based on increased agricultural production, improved access to markets, and increased rural incomes. In the power sector, industrial, commercial, and social benefits were substantial. The water supply, sanitation, and irrigation sectors were also shown to contribute to economic growth although ERRs were very low. For all sectors studied, ERRs after project completion were lower on average than ERRs projected when the project was designed.

The World Bank also judges completed projects against original project objectives (financial, economic, institutional, etc.) to determine whether they have been successful. Infrastructure projects were satisfactory in 85 percent of the cases, which is better than the 77 percent rate for noninfrastructure projects. Telecommunications was the best sector, with 96 percent satisfactory, and irrigation the least favorable at 25 percent. The performance rates for other infrastructure sectors were electric power, 92 percent; transportation 83, percent; and water and sewage, 86 percent.

In Egypt this assessment examined nine USAID capital projects that have been implemented over the last 15 years in the telecommunications, electrical power, water, and sewage sectors. The analysis found that projects were technically sound and well managed and helped provide the infrastructure necessary to support economic growth and the rapidly growing private sector. In the electrical power sector USAID projects provided 25 percent of Egypt's electricity capacity. The USAID telecommunications projects introduced a modern telephone system in Cairo and Alexandria and a series of USAID projects rehabilitated and expanded water and sewage systems serving over 23 million Egyptians. Data from the economic analysis of nine capital projects show a mixed picture but generally low-to-medium ERRs. The three Egyptian electrical power projects had an average rate of return of only 6.4 percent. The four telecommunications projects, at 12 percent, were much better. It was not possible to compute ERRs for the two water and sewer projects because health benefits could not be quantified.

The low rates of return are not a result of technical

problems the projects were well designed and used appropriate technology. In large measure poor performance is because of restrictive economic policies. These include government price controls, regulations, subsidies, and employment and management strictures that produce inefficient production and inefficient use of project outputs. The failure to price project outputs high enough to cover costs meant that output was priced too cheaply, with overconsumption and inefficient uses.

Conclusions on ERRs. A well-designed capital project, operating in a good economic policy environment, can achieve a high ERR. Economic growth will lag and private investment will not take place if a country's infrastructure is inadequate. It is important for a developing country to give priority to its basic economic infrastructure. However, both the World Bank and USAID have found that, even with the best equipment and engineering skills, capital projects will have low ERRs if they face inappropriate prices and government controls and regulations.

4.a. To what extent do capital projects (infrastructure projects in particular) support private sector growth in developing countries?

Capital projects focus heavily on economic infrastructure (electricity, water, roads, irrigation, telecommunications, and so on), which are essential for industry, commerce, and agriculture. The literature review reconfirmed that infrastructure development is needed for national economic growth and in particular to support private sector growth.
Egypt provides an excellent example of how USAID-funded infrastructure helped support a rapidly growing private sector. Without that infrastructure, it is doubtful whether the private sector could have flourished as it did in the 1980s and into the 1990s.

USAID's electrical power projects in Egypt provided an essential service for industry and commerce to work more efficiently and effectively. Manufacturing could not have expanded as rapidly as it did without a dependable electrical supply. The consistent supply of power in Egypt's major cities and resort sites has been key in supporting the rapid growth of tourism. At $2 billion to $3 billion a year, tourism is Egypt's largest source of foreign exchange, supports a large employment base, and provides markets for Egyptian products.

A modern, efficient telecommunications network is a crucial component of the economic infrastructure necessary to foster growth. Over the last 10 years in Egypt, USAID has been a major contributor to the development in telecommunications which has in turn supported Egyptian industry, commerce, tourism, and finance. In addition the Egyptian private sector firms that worked on the construction of the USAID capital projects received important benefits:

The private sector was exposed to new technologies and quality control techniques.

Local engineers and technicians learned critical operations and maintenance procedures.

Modern business management skills were introduced along with an attitude of professionalism

There were spin-off effects from training large numbers of government utility staff who have moved into the private sector. Conclusion. There is no question that investments in capital infrastructure provide important benefits for the private sector. Without adequate transportation, electricity, water, and telephones, businesses are reluctant to invest, and private sector growth suffers. Egypt is an excellent example of this investments in capital infrastructure were a critical enabling condition for private sector growth. To a large extent those investments made possible the rapid expansion of Egypt's private sector.

4.b. To what extent do capital projects contribute to reducing poverty and meeting basic human needs?

Critics argue that all too many capital proj-ects use overly sophisticated technology, fail to generate jobs, and provide benefits mainly for the well-to-do. However, capital projects can provide direct social benefits (water supply, sewers, schools, health clinics, and so on) to low-income populations and can increase employment and incomes of the poor. What has been the impact of capital projects on basic human needs?

The arguments in the published literature about the effects of capital projects on poverty alleviation and basic human needs take several forms. First, there is controversy concerning which type of project addresses poverty most appropriately. Donors worried about the direct effect of capital projects on poverty and basic human needs prefer to finance projects such as low-cost housing and agricultural facilities. They avoid projects such as international telecommunications or airports because these (especially the latter) are seen as too far removed from the poor. Some economists argue, however, that the direct effect of such projects is a less important determinant of poverty alleviation than the overall effect of investment on economic growth (almost regardless of type as long as the project has a high ERR). Large projects, such as major highways that are not necessarily targeted at the poor, are seen by some as having more measurable effects on poverty alleviation over the long run than more directly targeted projects, such as rural roads. More targeted projects often suffer from limited geographical impact, maintenance problems, replication difficulties, and heavy reliance on administrative reform.

Second, even when infrastructure projects target subsectors seen as having a more direct impact on the poor, there is no guarantee the poor will benefit. Rural electrification proj-ects, for example, have increased income disparities in rural areas because the poorest members of the population cannot afford electricity.

The opening up of remote areas through the construction of rural roads is sometimes a double-edged sword; although villagers can more easily move their goods to markets, the arrival of manufactured goods (bottled beer, for example) may displace traditional cottage industries (home brew). Moreover, if investment costs exceed benefits, even when there are benefits to the poor, the project may not be sustained and may have negative economic consequences over the long run. Many irrigation projects appear to fall into this category. The literature does not point to any firm conclusions. Rather, it is long on theory and short on empirical evidence.

In the sample of USAID projects, two-thirds had poverty alleviation or basic human needs as a project goal. Nearly one-third of project evaluations found that the project was currently or likely would become successful in raising incomes. Nearly half of the project documents suggested that capital projects would have a positive impact on education and health. Projects in the social sectors (education, health, water, and sanitation) have the most direct service and welfare benefits for the poor. The linkage is more indirect with other sectors but projects with high ERRs boost a country's rate of growth and generate important benefits for the poor. The major resource the poor have to offer is their own labor. If the economy grows rapidly, more jobs and higher paying jobs are created, which raises the income of the poor. Thus, the poor benefit from capital projects with high rates of return.

World Bank studies show a positive relationship between capital projects and basic human needs. The evidence indicates that capital proj-ects lead to improvements in health, education, and other social sectors. Water and sanitation projects have particularly strong direct health benefits. Even in the power sector, anecdotal information indicates that power projects contribute indirectly to education as, for example, schools and homes benefit from electric lights.

In Egypt reduced incidence of waterborne disease, better hygiene and cleanliness, and other benefits from improved water and sewage services have met a critical health need. While a number of factors affect health, clean water and sewage treatment are essential to any effort to improve health conditions. Diarrheal diseases (often a result of contaminated water and poor sanitation) are a leading cause of sickness and death among infants and children. Between 1977 and 1987 Egypt's infant diarrhea death rate dropped nearly 50 percent. During the same period diarrheal death rates for children aged 1- 4 years dropped by two-thirds.

Conclusion. Many USAID capital projects were designed at least in part to alleviate poverty or to help meet the needs of the poor. They seem to be generally successful in meeting those objectives.

5. Are capital projects sustainable?

The question of sustainability is central to all development

programs does the developing country have the institutional capabilities (financial, technical, and managerial) to carry on the project once donor funding ends? This may be more of a problem with capital projects (than with other development assistance) since capital projects often use sophisticated imported equipment and foreign technology. If the developing country cannot operate the new equipment, there will be problems in operations and maintenance and the project may fail.

The relationship between institutional capabilities for managing and maintaining capital facilities and the viability of the facilities is perhaps the one issue on which the literature draws to a very firm conclusion. Innumerable studies have pointed out that when capital proj-ects fail, or lose money, the outcome is much more frequently caused by weaknesses in the institutions responsible for managing them than by technical flaws in the design or construction of the facilities themselves. The very strong evidence in this regard suggests that donors should invest more capital development funding in technical assistance and training for institutional development. The literature survey found that donors with resident missions, such as USAID, have an inherent advantage in the implementation of institutional development projects over institutions, such as the World Bank, where operations are centralized.

Evidence from the sample of 68 projects suggests that sustainability might be a problem in many USAID projects: In half of the projects studied there were no requirements for the host government to develop either new dedicated maintenance programs or institutions to support the new infrastructure. There were host country maintenance requirements in only 46 percent of the projects and participant training in only 55 percent of the projects. User charges help ensure financial sustainability, but for 55 percent of the projects, such charges were not envisioned. For the completed projects that were to rely on user charges, most were not successful at recovering them.

Until recently, the World Bank treated infrastructure projects as a technical or engineering activity with only a modest institutional development component. Projects used conditionality, often unsuccessfully, to impose financial discipline. In recent years the Bank has broadened this focus to encompass sectoral operations geared to policy reform and sectorwide institutional reform programs. However, the World Bank has had problems with institutional development. Of the 1,250 capital proj-ects (covering the period 1978 to 1987), with institutional development components reviewed by the Bank, only 59 percent were considered likely to be sustainable; the threat to sustainability was largely due to institutional problems.
A continuing theme in the World Bank literature is the failure of local institutions to adequately operate and maintain capital equipment and infrastructure. Also common to all sectors is the failure of capital projects to adequately address this problem. Although the problem is well documented and has been assigned a high priority by the Bank, effective and sustainable operations and maintenance (O&M) programs are still difficult to achieve.

World Bank literature indicates that inadequate O&M is a major factor contributing to low ERRs in completed projects. The use of inappropriate technology in capital projects, although not completely absent, was not often found to be a problem. The sustainability of capital projects is seen as depending strongly on host country policies, particularly in regard to the collection of user charges for infrastructure services. Adequate revenues from user charges are important for the sustainability of O&M efforts. The literature points out the importance of analyzing user willingness and ability to pay for services as a part of project planning. Community and beneficiary involvement in the planning process and follow-on O&M activities is also cited as a requirement for ensuring sustainability of completed infrastructure.

In Egypt USAID capital projects were operating well, but there were several factors that threaten future project sustainability. Inadequate financial resources and a lack of project autonomy harm project viability. Utilities are not allowed to raise tariffs to adequate levels and do not receive sufficient funding to cover their costs. The Government mandates personnel and operating practices, which has created a totally inadequate salary structure and extreme overstaffing. Technical operations and maintenance practices vary greatly, but a lack of preventive maintenance and spares is a common problem. In addition, training and employee compensation need to be improved if performance is to be maintained.

Conclusion. The development of effective institutions is essential if capital projects are to be sustainable. This assessment found that machinery and equipment are usually appropriate, but at times there are problems with the institutions that manage and operate the projects and with inadequate user fees. At a minimum, utilities that operate capital projects should generate adequate revenues to cover O&M costs and to generate internal revenues (or be able to support borrowing) that will finance expansion plans based on well-designed demand studies.

6. How have capital projects helped in policy reform?

As long as there have been aid programs, donors have used their assistance as a means of encouraging change. Although donors cannot really buy reforms, they can use their programs to support policy changes. While USAID cash transfers and commodity import programs (CIPs) have been used most often to support policy reforms, capital projects also have been used to support reforms. For example, if USAID is going to fund an electrical generation project and the developing country has set electricity rates too low, the project will not be financially viable. The same would be true of a road project where the developing country has no interest in road maintenance. The road could be built but it will be in disrepair and unusable in a few years. In such cases it makes sense to link assistance to policy changes. Difficulties can arise when capital projects are linked to policy reforms. Policy promises are usually made at the start of a

project, but the project may take many years to complete. When equipment has been ordered and concrete has been poured, it is hard to stop a project if a policy reform does not take place. The evidence from the literature on the extent to which capital projects have been effective in promoting policy reform is inconclusive. Still, the literature does point out that sector-specific policy reform is essential to the success of capital projects. Policy reform does not necessarily have to be linked directly to capital projects. Some of the more effective reforms have been a part of macroeconomic assistance or sectoral nonproject assistance. The important point is to identify the economic policy constraints and then to use the policy tool (project, sectoral, or macro) best suited to the local country conditions.

The literature also suggests that sector-specific conditionality associated with projects is less intrusive and more acceptable to host countries than the broader macroeconomic policy reform associated with nonproject assistance and that, for this reason, the former may be more successful than the latter.
From the sample of USAID projects, it appears that policy reform was not a major objective. {Footnote 4} In 86 percent of the projects there were neither conditions precedent nor covenants related to sector or subsector policy reform. In only half of the projects with conditions related to policy reform were the reforms successfully adopted or implemented. When countries failed to comply with the conditionality, USAID rarely took steps, according to the documentation, to enforce the conditions or otherwise influence the government to adopt or implement the policy reforms.
World Bank financed capital projects that did contain policy conditions were not that effective. The most frequent failure was the inability to sustain user charges.

Policy issues are recognized and targeted as areas of concern to the Bank. However, in the era of structural and sectoral adjustment, capital projects are not the only vehicle the Bank uses to promote policy reform; efforts often focus at the national or sector level, not just at the project level.
In Egypt USAID had great difficulty pushing for policy reform with both capital projects and other types of assistance. Capital project policy conditionality was often not achieved or met only many years late. Policy reforms were not met with the first three telecommunications projects. It took 4 years after the original telecommunications project began to achieve some limited reforms and several more years to achieve further reforms. For electrical power, USAID/Egypt's fiscal year 1990 Action Plan pointed to very limited success with sector policy reform. Instead of covering costs, electricity rates in 1989 were one-fourth of real economic costs. In the water sector, from 1977 to 1989, revenue goals were not met, although future prospects are better. There were similar problems in the wastewater sector.

USAID capital projects in Egypt included conditionality designed to improve the policy environment. However, nondevelopmental interests proved to be more important, and economic policy reform usually took a back seat to U.S. political and security concerns.

The USAID Mission in Egypt feels that with recent political changes and Egypt's growing economic problems the environment has changed and the Egyptian Government is more willing to make critical policy changes.

Conclusion. In the literature, within the World Bank and at USAID, the policy issues critical to the success of capital projects are well understood. However, while there have been some successes, all too often it has proved difficult to use capital projects as a vehicle for policy reform.

7. Is there a tradeoff or conflict between development and U.S. commercial interests?

A key question is whether or to what extent a focus on commercial objectives might undermine development effectiveness. This may be more of a problem with capital projects that are undertaken to address trade objectives. Capital projects driven by a donor's export interests have been criticized for having too high an import component, paying inadequate attention to the policy or institutional setting, and using technologies inappropriate to the factor endowments and level of development of the recipient countries.

The published literature leans heavily toward the conclusion that efforts of donors to promote their own commercial interests through capital projects are inconsistent with and counterproductive to the promotion of development. The argument is that the tying of aid distorts trade patterns and promotes the export of goods in which the donor country is not competitive. Over the long run the best way for a donor to increase its exports to developing countries is through the promotion of economic growth in developing countries, which will increase their demand for imported goods. The newly industrialized countries in Asia, such as Korea and Taiwan, are cited as examples.

It is interesting that among the major bilateral donors, the United States is the least inclined to allow commercial objectives to dominate development objectives. A possible reason is that in past years the United States has enjoyed a technological and commercial edge in most industries so that specific promotion devices were seen as unnecessary. More recently, of course, U.S. competitiveness has waned, especially in favor of the Japanese. That development has sparked a renewed interest in the commercial objectives of foreign aid.
Analysis of USAID's worldwide experience indicates that developmental needs rather than U.S. commercial interests were the primary goal and driving force behind capital projects. In only 14 percent of the projects was the sale of U.S. equipment or machinery a stated goal. In 67 percent of the projects studied, the technology provided by the United States was considered appropriate to the needs of the recipient. In only 20 percent of the projects were problems reported because of either inappropriate technology or operator unfamiliarity.

In Egypt the assessment found that equipment and technology were selected on the basis of Egypt's developmental needs rather than U.S. commercial interests. U.S. commercial concerns did not distort the developmental benefits of USAID capital projects projects were not designed to maximize U.S. commercial interests.

Conclusion. Commercial concerns have not adversely affected the developmental impact of USAID projects. Current USAID capital projects are aimed primarily at development objectives rather than U.S. commercial interests. The capital technology is appropriate to the needs of the host country and in most cases an attempt is made to improve institutional effectiveness.

4. Conclusions and Recommendations

Commercial Benefits

USAID capital projects have not been an important tool for developing commercial markets for U.S. exporters. Procurement tying and buy America work effectively for USAID project procurement but follow-on commercial exports have been weak or nonexistent.

USAID-funded projects have benefited little from other donor funding or private investor participation. For the most part USAID capital projects have been designed to meet specific developmental needs and to follow U.S. Government procurement regulations. To achieve leverage by encouraging other donors' and private investors' participation, USAID would have to refocus and change its project design criteria.

Developmental Benefits

Capital projects are an essential part of country development programs. Reliable and appropriate infrastructure is critical to private sector growth. Capital projects designed to alleviate poverty or to help meet the needs of the poor have generally been successful.

USAID managers should insist on realistic analysis of economic rates of return (ERR) on capital project investments. And they should approve only those projects thus projected to achieve high EERs. A well-designed capital project, operating in a good economic policy environment, can achieve high ERRs. However, most projects have had only low-to-medium rates of return. They should do much better with a minimum ERR of between 10 and 15 percent and ideally well above 20 percent. At the time of project selection and design, USAID managers need to take a hard look at the assumptions behind the cost-benefit analysis. When projects are being implemented, reality checks on assumptions concerning policy reform, prices, and subsidies are needed.

Focus major attention on economic policy reforms and institutional reforms. Both the World Bank and USAID have found

that technical and engineering issues are rarely the problem inappropriate economic policies and ineffective institutions most often threaten project viability and sustainability. However, capital proj-ects have not been a very successful means of encouraging policy reforms. When considering a new capital project, USAID should rigorously analyze the economic and institutional policy environment. If conditions are not favorable it may not make sense to go ahead with the project. Alternatively, USAID should insist on policy reforms being put in place before a project is approved or before obligated funds are disbursed.

FOOTNOTES:

1. The study covers the 1980s when the U.S. dollar was often overvalued. Since the late 1980s the U.S. dollar has not been overvalued and the competitiveness of many U.S. exporters has improved.
2. See Fox, James W. 1993. "Capital Projects: U.S. Aid and Trade in Egypt". USAID Technical Report No. 8. Washington, D.C.: USAID.
3. Usually the original aid package for a capital project includes some spares and replacement parts. This reduces the need for commercial imports. In the case of Egypt, USAID projects often included a generous supply of spare parts.
4. There may be several reasons for the apparent lack of conditionality in USAID capital projects: USAID rarely uses capital projects for policy reform. Projects have been viewed as technical solutions to technical problems and policy reform has been left to other assistance instruments. The data base includes only completed projects and many were started in the late 1960s and 1970s. Policy reform came into its own in the 1980s and many of these older (pre-1980) projects were not concerned with policy reform. Another problem is that many developing countries do not want to appear to be bowing to outside pressure from the United States. Even though the developing country government may agree with the reforms, the idea that the United States can tell a sovereign government how to run its economy is viewed as politically unacceptable. To overcome this problem USAID often uses unpublished "side letters" or other unpublished agreements. Thus, there is no record of the policy reform agreement.